

REMARKS

Claim Status

Claims 1-24 are currently pending, with claims 1, 9 and 17 being in independent form. Claims 1, 7, 9 and 10 have been amended. The Specification has been amended. The set of drawings has been amended. Claims 17-24 have been added. Support for independent claim 17 may be found in Figs. 2a, 3a and 3b, as well as at pg. 7, lines 6-15 of the Substitute Specification (paragraph [0031] of published application 2005/0122035). Support for dependent claims 18-22 may be found at pg. 10, lines 1-9; lines 12-13 of the Substitute Specification (paragraphs [0050] and [0052] of published application 2005/0122035). Support for dependent claims 23 and 24 may be found in Figs. 3a and 3b, as well as at pg. 10, lines 12-13 of the Substitute Specification (paragraph [0052] of published application 2005/0122035). No new matter has been added by way of this amendment. Reconsideration of the application is respectfully requested.

Overview of the Office Action

The drawings and the disclosure have been objected to for certain informalities. Withdrawal of these objections is in order.

Claim 7 has been objected to because of certain informalities. Withdrawal of this objection is in order.

Claims 9-16 stand rejected under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Withdrawal of this rejection is in order based on the amendments herein.

Claims 1-3 and 9 stand rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,828,042 ("*Imanishi*"), while claims 4 and 12 stand rejected under 35 U.S.C. §103(a) as

unpatentable over *Imanishi* in view of U.S. Patent No. 4,123,269 (“*Von Hoene*”). Claims 5-8 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Imanishi* in view of U.S. Publication No. 2004/0155576 (“*Tyan*”). Claims 10, 11 and 16 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Imanishi* in view of U.S. Publication No. 2005/0170737 (“*Seo*”), while claims 13-15 stand rejected as unpatentable over *Imanishi* in view of *Seo*, and in further view of U.S. Publication No. 2005/0170075 (“*Chung*”). Applicants have carefully considered the Examiner’s rejections, and the comments provided in support thereof, and respectfully disagree with the Examiner’s analysis. For the following reasons, Applicants respectfully assert that all claims of the present application are patentable over the cited references.

Amendments Addressing Section 112 issue and Formalities

The Examiner has stated that “Figure 1 should be designated by a legend such as -- Prior Art -- because only that which is old is illustrated”.

In response to this objection, Applicants have submitted amended Fig. 1 which has been amended to designate that Figure 1 is prior art. Accordingly, entry of amended Fig. 1 is respectfully requested.

The Examiner has stated that “a substitute specification excluding the claims is required ... because the number of changes renders it difficult to consider/understand the application”. In response to this requirement, Applicants have provided a Substitute Specification, along with a marked-up version which indicates the changes to the Specification.

The Examiner has stated that “it is unclear where the amorphous layer matrix material is located in the OLED” recited in claim 7. In response to this objection, Applicants have amended claim 7 to clarify the location of the amorphous layer matrix material. Support for the

amendment to claim 7 may be found, for example, at pg. 10, lines 10-13 of the Substitute Specification (paragraph [0056] of U.S. Publication 2005/0122035 A1).

The Examiner has stated that the limitation “coating step” in independent claim 9 lacks antecedent basis. The Examiner has also stated that the limitation “the forming polymer” in claims 10 and 13-16 lacks antecedent basis. In response to these rejections, Applicants have amended the claims to address each specific rejection in a self-explanatory manner. Therefore, reconsideration and withdrawal of the rejections are in order.

Summary of the Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The invention is directed to an organic light emitting diode (OLED) with at least one active, light emitting organic layer which has refractive index inhomogeneities, wherein the organic layer has at least one first partial region and at least one second partial region which comprise organic material and have different refractive indices, and the partial regions form a layer with a composite-like structure (see pg. 6, lines 15-23 of the substitute specification).

Another aspect of the present invention is directed to a method for producing an organic light emitting diode (OLED) with at least one active, light emitting organic layer which has refractive index inhomogeneities, wherein the material of the organic layer is applied to a carrier in such a way that, during or after the coating step, at least one first partial region and at least one second partial region form in the layer. The partial regions have different refractive indices, and

the partial regions form a layer with a composite-like structure (see pg. 6, lines 25-34 of the substitute specification).

Descriptive Summary of the Prior Art

Imanishi relates to an organic electroluminescence device in which light discharge efficiency is improved by adjusting the molecular orientation based on predetermined guidelines to ensure that the transition dipole moment of the light emitting material has the optimum direction, and an intermediate layer is provided to adjust the refractive index and to obtain the optimum directivity (see *Abstract*).

Von Hoene relates to “an overcoated, electrostatographic photoreceptor which can be fabricated in a flexible belt form on a plastic film base and is potentially capable of providing long life, panchromaticity and high speed” operation (see col. 2, lines 44-47).

Seo relates to “a luminescent device using an organic luminescent device whose organic compound film contains a high-molecular compound and which requires a lower drive voltage and has a longer life than [conventional] luminescent devices ... and a method of manufacturing the luminescent device” (see paragraph [0002], lines 6-11).

Tyan relates to a method of providing “a microcavity OLED device with improved luminance efficiency and color quality” (see paragraph [0015], lines 1-3).

Chung relates to “a method of evaporating thin film used in an organic electro-luminescent (EL) display” (see paragraph [0002], lines 2-4).

Patentability of the Claims Under 35 U.S.C. §102(b)

Independent claims 1 and 9 have been amended to recite that the organic light emitting diode (OLED) has “at least one active, light emitting organic layer which has refractive index inhomogeneities”. Support for this limitation may be found, for example, in Figure 2A of the present invention. From this drawing it is readily apparent to one skilled in the art that the active organic layer 1 along with emitter 6 comprises regions 1B having a different refractive index than the layer matrix material 1A. Support for the amendment to claim 7 may also be found at pg. 7, lines 6-15 of the Substitute Specification (paragraph [0031] of the published application). No new matter has been added.

Imanishi (col. 27, lines 21-25) states “FIG. 15(a) shows the second intermediate layer (30) where a dispersion plane is provided on the plane opposite to the light emitting layer in order to bend the direction in which the light is emitted from the light emitting layer (31) upward”. That is, *Imanishi* (Fig. 15a) teaches an OLED with a homogenous light-emitting layer (e.g. layer 31), which is followed by one or more non-active intermediate layers (e.g. layer 30). However, *Imanishi* fails to teach a device that has “at least one, active light emitting organic layer,” as recited in amended independent claims 1 and 9. In view of the foregoing, Applicants respectfully assert that amended independent claims 1 and 9 are not anticipated by *Imanishi*. Therefore, reconsideration and withdrawal of the rejection under 35 U.S.C. §102 is in order, and a notice to that effect is earnestly solicited.

Moreover, due to the fundamental above-discussed difference between the present claimed invention and *Imanishi*, it is clear that the present invention is patentable over this reference under 35 U.S.C. §103.

New independent claim 17 is likewise patentable over *Imanishi* under 35 U.S.C. §103 for the reason presented above with respect to claims 1 and 9.

Patentability of the Claims Under 35 U.S.C. §103(a)

The Examiner cites *Von Hoene* in an attempt to cure the shortcomings of *Imanishi*, i.e., the “organic layer has electrically inactive material,” as recited in dependent claims 4 and 12. However, the combination of *Imanishi* and *Von Hoene* fails to achieve the invention recited in amended independent claims 1 and 9, since *Von Hoene* also fails to teach or suggest an “organic light emitting diode (OLED) [that] has at least one active, light emitting organic layer which has refractive index inhomogeneities as recited in amended independent claims 1 and 9. *Von Hoene* only teaches the use of an electrically inactive material. In view of the foregoing, Applicants respectfully assert that dependent claims 4 and 12 are patentable over the cited references, singly or in combination, based on their dependency on independent claims 1 and 9. Therefore, reconsideration and withdrawal of the rejections under 35 U.S.C. §103 are respectfully requested.

The present application is a National Stage application of corresponding PCT application number PCT/DE02/04346 which was filed on November 27, 2002, and is entitled to claim priority to foreign application Serial No. 101 640 16.1 filed on December 28, 2001 in Germany.

Tyan has a filing date of February 4, 2004 and claims priority as a continuation-in-part application of, *inter alia*, applications Serial No. 10/364,424 and Serial No. 10/347,013 each of which were filed on January 17, 2003, which is subsequent to the filing dates of the PCT application and the German priority document (i.e., December 28, 2001) upon which the present

application claims priority. Therefore, *Tyan* does not qualify as prior art. As a result, the deficiencies of *Imanishi* still remain.

Seo has a filing date of March 2, 2005, and is a divisional application of application Serial No. 10/043,786 filed on January 10, 2002 which is after the filing date of the priority document (i.e., December 28, 2001) upon which the present application claims priority.

Therefore, *Seo* does not qualify as prior art. As a result, the deficiencies of *Imanishi* still remain.

Chung has a filing date of March 2, 2005, and is a continuation of application Serial No. 10/055,646 filed on January 22, 2002 (now U.S. Patent No. 6,869,636), which is subsequent to the filing date of the German priority document (i.e., December 28, 2001) upon which the present application claims priority. Therefore, *Chung* does not qualify as prior art. As a result, the deficiencies of *Imanishi* still remain. Thus, independent claims 1 and 9 are patentable, and withdrawal of all the rejections under 35 U.S.C. §103 is in order for these additional reasons, and a notice to that effect is earnestly solicited.

New independent claim 17 is likewise patentable over *Imanishi* under 35 U.S.C. §103 for the reasons presented above with respect to claims 1 and 9.

Dependent claims

In view of the patentability of independent claims 1, 9 and 17, for the reasons presented above, each of dependent claims 2-8 and 10-16, as well as new dependent claims 18-24 is patentable therewith over the prior art.

Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited.

Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

Respectfully submitted,

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Amendments to the Drawings:

The attached replacement drawing sheet includes changes to FIG. 1 which has been amended to indicate the drawing constitutes prior art.